

Jackson County Green Energy Park



Project Overview

✧ ***Captures methane gas from the old Dillsboro landfill for use as a fuel.***

✧ ***Provide process heat for:***

- **Blacksmith forges**
- **Metal Foundry**
- **Glassblowing studios**
- **Greenhouses**
- **Facility heating**
- **Pottery studios (future)**



✧ ***Old warehouse and trash transfer buildings being refurbished for artist studios.***

✧ ***Use LFG as fuel to drive economic engine.***

Background Info



- ***Located in mountains of western North Carolina.***
- ***Adjacent to Great Smoky Mountains National Park (most visited park in U.S.) and historical homeland of Eastern Band of Cherokee Indians.***
- ***Tourism, recreation, and education largest economic drivers for region.***

- ***Millions of visitors come to the region to enjoy a wealth of outdoor and cultural activities.***
- ***Strong traditions of crafts, music, and self-sufficiency.***
- ***Established destination for tourists seeking authentic heritage crafts.***
- ***Dillsboro landfill closed in 1999, with roughly 750,000 tons of trash in place.***
- ***Concerns over methane migration prompted County to examine LFG capture.***
- ***County re-purchased property and buildings adjacent to the landfill, and began initial phases of design and construction.***

Jackson County, NC

(looking west from Blue Ridge Parkway)





JCGEP Mission Statement



The Jackson County Green Energy Park utilizes clean, renewable energy resources to encourage **economic development**, provide **environmental protection**, and offer **educational opportunities** that together will help lead towards a more sustainable future for western North Carolina.



Economic Impact



● ***Encourage the success of new artisans***

- Two blacksmith tenants.
- 12 glass artists currently utilizing glass facilities.
- Public classes offer income to artists and educational opportunities for community members.
- Handmade in America report indicates \$206 million impact of art/craft activities in WNC.

● ***Growing Income Stream from Class Fees and Rental Income***

● July 2010 –	\$1,753
● August 2010 -	\$2,024
● September 2010 -	\$2,106
● October 2010 -	\$3,512
● November 2010 -	\$4,033

- ***Use of greenhouse has opened new business opportunities Ray's Florist.***
- ***County Grounds Department growing own landscaping plants to reduce costs.***
- ***International visitors from India, Ukraine, Brazil, Mexico, and Venezuela in last 12 months alone.***
- ***Increased eco-tourism and heritage crafts tourism benefits many other businesses in the county.***
- ***Encourage other renewable energy and sustainability projects.***

Environmental Protection



By burning landfill gas in a controlled fashion, the Green Energy Park helps improve local air quality and protect the environment.

- Prevents methane from escaping into the environment.
- Removes odors caused by leaking LFG.
- Transformed a trash-covered eyesore into a beautiful public place.
- Jackson County committed to managing LFG.

<i>Environmental Savings to Date</i>	
<i>Methane</i>	<i>888 tons</i>
<i>CO² equivalent</i>	<i>22,200 tons</i>

Annual Environmental Benefits

(pollution savings equivalent to any one of the following)

- ❖ ***Removing 916 vehicles off the road.***
- ❖ ***Planting 1,305 acres of forest.***
- ❖ ***Preventing use of 11,104 barrels of oil.***
- ❖ ***Displacing 521,870 gallons of gas.***



Classes and other Educational Opportunities



- ***Provides hands-on demonstrations of renewable energy and energy conservation.***
- ***Tours for schools and civic groups, government organizations, tourists, and research professionals.***
- ***Creating a bridge between “academic” learning at local schools, and real-world applications of skills and knowledge.***
- ***GEP has offered 36 public art class series since 2007, with over 300 attendees.***
- ***For-credit glassblowing class offered through Western Carolina University. Southwestern Community College has demonstrated interest in classes for 2011 as well.***
- ***Youth-specific blacksmith classes offered with funding from ARC.***
- ***Cherokee-specific metalworking classes requested and conducted.***
- ***GEP Director Timm Muth to be awarded Associated Faculty position at WCU, furthering partnerships.***

Landfill Gas Supply System

- ◆ *9 acre landfill with 9 gas wells*
- ◆ *Average gas flow - 40 cubic feet per min*
- ◆ *Methane content - 58% - 62%*
- ◆ *Heating value - 1.2 Million Btu/hr*
 - 1 Btu = Heat of 1 kitchen match
 - Average residential gas furnace = 60,000 Btu/hr
 - LFG resource ~ 20 gas furnaces burning continuously
- ◆ *New multi-stage blower and removal of well water should increase level of gas flow.*



Site Clean-up



Original mess

- ***Over 550 tons of loose debris and trash removed from project site.***



After clean-up

- ***Site for old recycling center and trash transfer station had accumulated many years' worth of salvaged materials and junk.***



- ***Unsightly brownfield restored to usable facility and attractive, green space.***

Crafts Building Rehabilitation



- ***Old trash transfer station was in serious disrepair, with no interior walls, ventilation, or lighting, and most of the siding missing or damaged.***

- ***Crafts Building reconstructed to house metals and glass studios.***



Greenhouses

- ***Old gutter-connect greenhouses donated to project.***
- ***~ \$25,000 savings realized by County by reusing steel greenhouse framework.***
- ***Over 7,500 square feet of greenhouse space reconstructed.***
- ***Boiler operates on LFG or biodiesel/fuel oil/WVO, provides heat through hydronic piping system.***



Greenhouses

- *Heated greenhouses have opened up new business opportunities for local florist.*
- *Public workshops well attended.*
- *County Grounds Dept. realizing significant savings by propagating and growing landscaping plants for County use.*
- *Local community college to begin using greenhouses to grow landscaping plants as well.*



Glassblowing

- ❖ ***Glass Hot and Cold shops fully functional.***
- ❖ ***Twelve (12) regional glass artists currently utilizing shop space.***
- ❖ ***Public glassblowing classes in 2010 attracted 120 attendees.***



Metals Studio/Blacksmithing

- ***Only blacksmith forges in the world fired on landfill gas.***
- ***High temperature of 2373° F.***
- ***Facility provides forges, metalworking equipment, and studio spaces for three tenant smiths, plus foundry area.***



- ***JCGEP Metals Studio opened a new career opportunity for resident blacksmith, John Burtner.***
- ***Public adult and youth classes ongoing.***

Metals Studio/Foundry

- ***Only LFG-fired art foundry known.***
- ***Partnership with WCU offered metal casting to Fine Arts Dept.***
- ***Public metal pours attracting a range of participants.***



- ***Foundry opens new opportunities for metal artists.***
- ***Making plaques for EPA awards.***
- ***Bronze plaque poured for Cherokee Language Center.***

Waste Heat Recovery

- *Maximizing efficiency by capturing and reusing waste heat from forges (and glass furnace in future).*
- *Heat exchangers placed behind forges and above glass furnace.*
- *Heat collected circulated back into building for space heating.*
- *Heat exchangers and radiators fabricated from leftover greenhouse parts.*
- *Waste heat may be used to supplement greenhouse heating.*



HX by Forge



Radiator in Glass Shop

Youth Arts Festival

● ***Annual arts festival,
free of charge to public.***

- 200 attendees – 1st year
- 400 attendees – 2nd year
- 800 attendees – 3rd year

● ***Tremendous community
impact.***



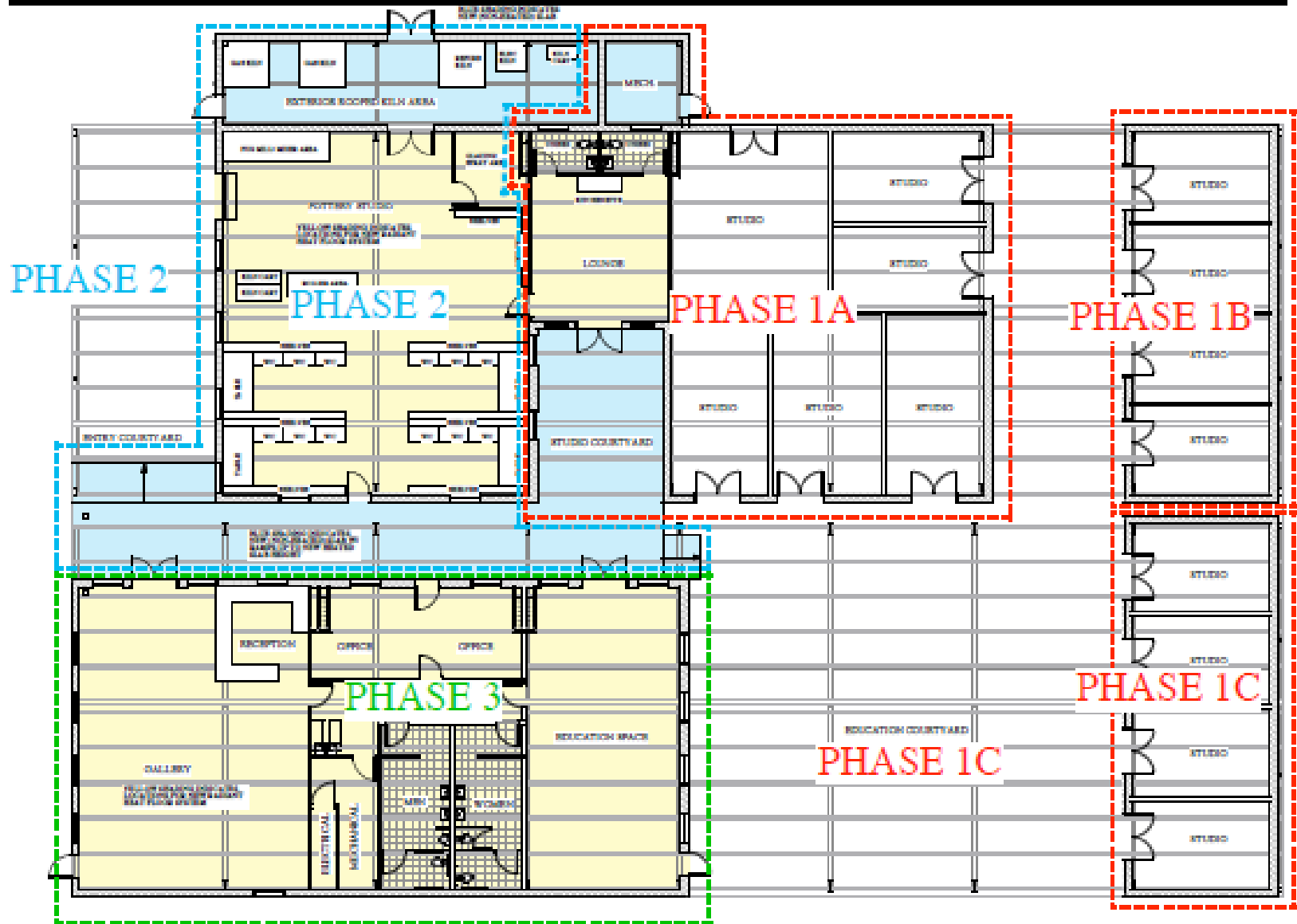
- ***25+ artisans, each demonstrating
their craft and skills.***
- ***Music and dance groups all day.***
- ***Hands-on art activities for kids of
all ages.***
- ***Easy to educate folks when
they're having fun!***

Visitors to the Green Energy Park

- **NC Governor Beverly Perdue**
- **U.S. Senator Richard Burr**
- **U.S. Congressman Heath Shuler**
- **Appalachian Regional Commission national conference**
- **Visiting engineers, politicians, and artisans from Brazil, Mexico, Ukraine, Venezuela, and India.**
- **800 – 1,000 visitors each year and growing.**
- **Constant influx of tour groups from regional schools, EBCI, homeschoolers, and local organizations.**



Future Craft Center Complex



Future Craft Center Complex

Construction of the Craft Center Complex will complete the initial Master Plan of JCGEP, and will include:

- ***A professional ceramics studio with four studio spaces, three kilns, and a full complement of equipment;***
 - The pottery kilns will utilize renewable fuels: two of the kilns will be fired using landfill gas, while a 3rd kiln will be designed to utilize waste wood and waste vegetable oil as alternate fuels.
- ***Fourteen (14) “open” studio spaces.***
 - Studios will accommodate renters of the various “hot” shops (blacksmithing, glassblowing, and pottery), as well as other local artists (woodcarvers, jewelry makers, basket weavers, etc.) in need of working spaces
- ***A multi-use education center, an artists’ gallery, two offices, and a bathroom facility.***

Benefits to County/Project

- **NEW ECONOMIC DEVELOPMENT**
Completion of this effort will create new job opportunities for eighteen (18) more artisans. Growing community of artists will help to draw additional tourism.
- **INCREASED RENTAL INCOME**
Once all artist studios and residency positions are filled, yearly rental income will offset GEP’s operational costs.
- **SELF-SUSTAINABILITY**
Administrative costs of the GEP continue to be offset by savings realized through the County greenhouse operations. Considering both rental income and cost-avoidance, the Green Energy Park can become self-sustaining.

Craft Center Complex Budget

Project Phase	Description	Estimated Costs
1A	<i>Six (6) studio spaces plus area restroom</i>	<i>\$162,230</i>
1B	<i>Four (4) studio spaces</i>	<i>\$50,450</i>
1C	<i>Four (4) studio spaces</i>	<i>\$54,046</i>
2	<i>Pottery studio, kiln area, four (4) resident artist spaces</i>	<i>\$205,515</i>
3	<i>Gallery, education center, offices, reception area, public restrooms</i>	<i>\$348,147</i>
	<u>Efforts already Completed</u>	<u>Costs</u>
	<i>Demolition of old warehouse</i>	<i>\$14k</i>
	<i>Architect/engineering design</i>	<i>\$45k</i>
	<i>Pottery equipment</i>	<i>\$52k</i>

Ongoing Efforts

Rainwater Collection

- Greenhouse gutters being connected to 8,000 gallons storage. Will meet all needs for hand-watering of plants.

Waste Vegetable Oil Filtration and Storage

- WVO delivered from local restaurants and households. Used to supplement boiler fuel, and as primary fuel for future pottery kiln.

Wood/Oil Fired Kiln

- \$10,000 grant secured through Resourceful Communities for outdoor ceramics kiln.
- Kiln designed to fire on wood and/or waste vegetable oil, to demonstrate additional uses of renewable resources.
- Kiln will be constructed as part of a kiln-building workshop, offsetting costs while offering a unique educational opportunity for artists.

Future Plans

✿ Anaerobic Digesters

System to turn organic material (food scraps) directly into methane gas and compost. Would reduce County and local business costs for waste disposal, while providing additional methane.

✿ Solar hot water collectors

Additional heat for greenhouses.

✿ Photovoltaics Panels on Landfill

Provide green energy sales and offset electric usage.

✿ Artificial wetlands

Dispose of landfill gas condensate on-site.

✿ Viewing Platform

Walking trail and platform at top of landfill, overlooking train wreck from the *The Fugitive*.

Awards and Recognition

- ***EPA 2006 Community Partner of the Year***
- ***2007 Community Project award from the NC Association of County Commissioners***
- ***2007 NC Economic Development Leadership Award, from NC State Energy Office***
- ***2008 Partnership Award from WCU Service Learning***
- ***Featured project (1 of 4) in EPA's latest international landfill gas flyer.***
- ***Article in USA Today, February 2006***
- ***Articles featured in over 20 local and regional media outlets.***
- ***GEP Director, Timm Muth, has been a requested keynote speaker at several regional and national energy and sustainability conferences.***

Contact Information

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